Increasing Profitability by Improving Efficiency of Montana's Farm and Ranch Lands

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Montana Pulse Day
Great Falls, 12/9/15

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Montana Research and Economic Development Initiative- $15 million

- FY 16-17 Biennium: 11 Funded Projects
- Agriculture: Increasing the Profitability by Improving Efficiency of Montana's Farm and Ranch Lands
  - $2.23 Million
  - 24 Faculty Investigators
    - MSU-Research Centers, Animal and range Science, Land Resources and Environmental Sciences, Chemistry, Computer Science, Agricultural Economics, Sociology and Plant Sciences and Plant Pathology
    - UM- Climate Center
    - 3 MT companies
- https://mus.edu/research_initative.asp

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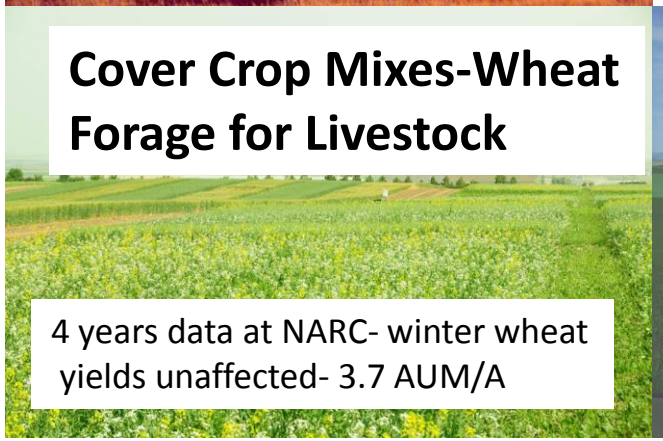
Wheat- Fallow
1930s technology

Now

Wheat-Fallow system - **land use is not optimized**

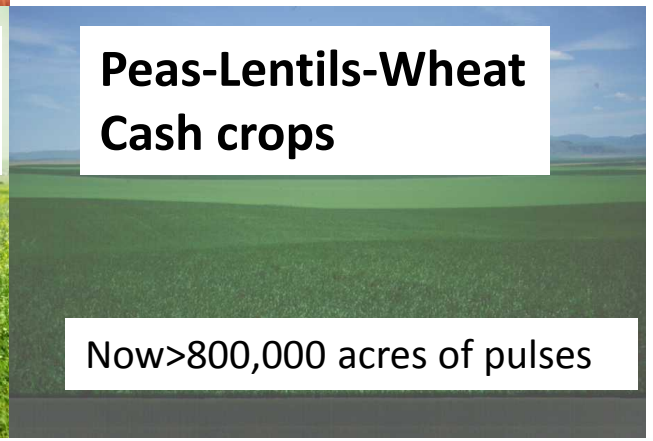
4.6 million acres that could produce annual income

Cover Crop Mixes-Wheat
Forage for Livestock



4 years data at NARC- winter wheat yields unaffected- 3.7 AUM/A

Peas-Lentils-Wheat
Cash crops



Now>800,000 acres of pulses

The Future

Annual cropping with uncertainty managed by products of this research

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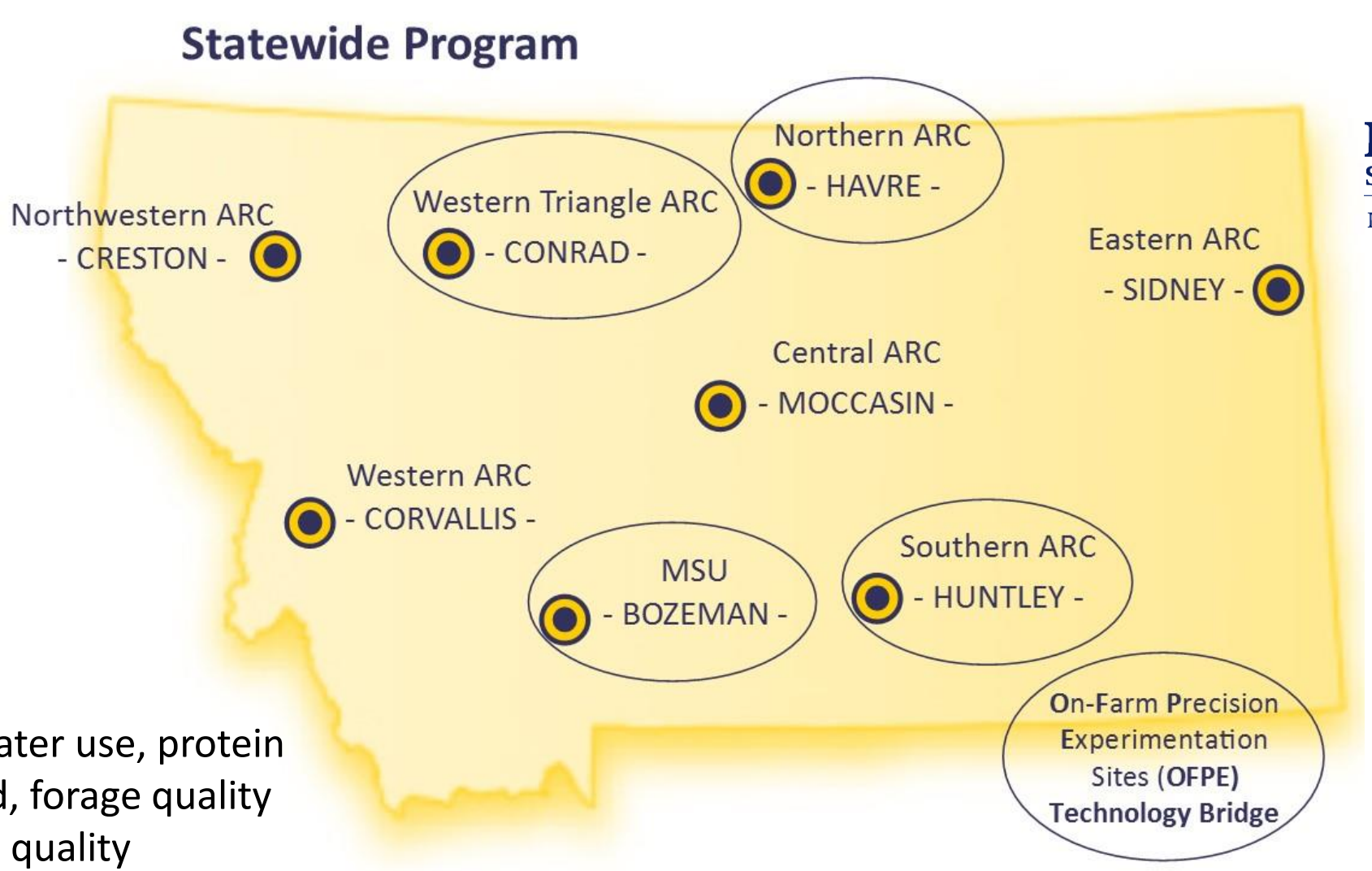
- **Three interrelated goals: Optimize productivity of MT lands**
  - **Intensify pulse and cover crop production of 4.6 million acres of land left fallow each year.**
    - **Crop-fallow- 1 year's income forgone to store moisture for next wheat crop-1930s technology-"Chem-fallow" also has ~$65/a fixed and variable costs**
    - **Research has shown pulse and cover crop mixes can be used safely to produce annual crops or 3 crops in 4 years**
    - **Address barriers to adoption such as herbicide residues from crop fallow, adapted varieties, markets, soil moisture prediction**
  - **Develop new, improved or quality differentiated products, crops or farm practices**
    - **New MT adapted pulse crop and durum wheat varieties**
    - **State focused breeding programs have generally provided ~5% yield increases**
  - **Increase adoption of precision agriculture technologies**
    - **Technologies developed in this proposal will help take uncertainty and risk out of annual cropping systems**
    - **Optically-based controllers for spray nozzles- fallow/ in crop?**
    - **Provide new jobs in crop consulting, crop sensor and software/data management**



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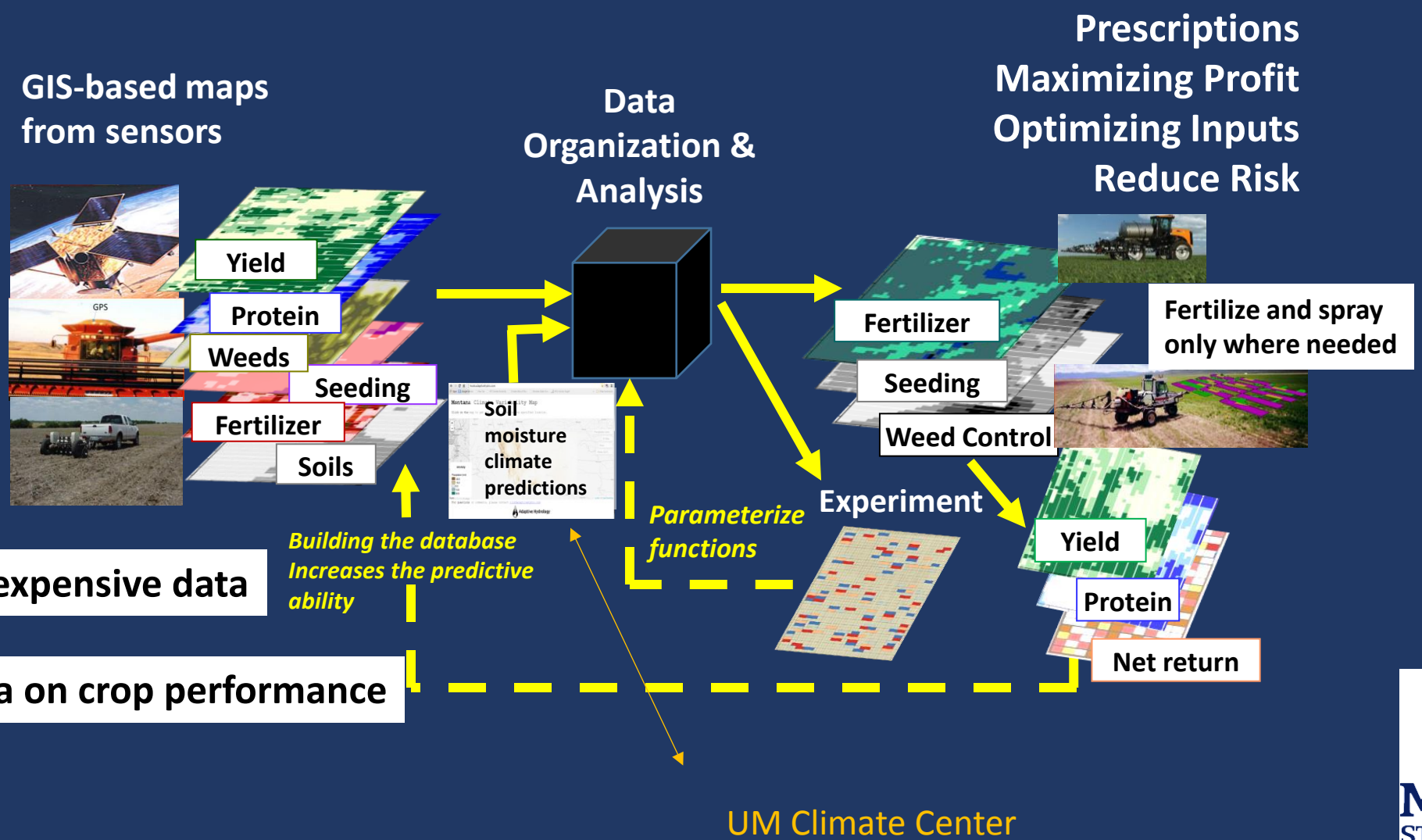
Performance trials

Pulse variety- yield, water use, protein

Cover crop mixes-yield, forage quality

Durum varieties-yield, quality

On Farm Precision Experiment Framework



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Research Team leaders

- **Pulse Crops** -Chengci Chen, Perry Miller
  - Pea, lentil, chickpea variety testing- yield, protein, water use
- **Cover Crop Mixes** -Darrin Boss, Emily Glunk
  - Spring/fall seeded cover crop mixes- yield (grazing/hay), forage quality, nitrates
- **Durum Wheat** -Mike Giroux, Northern Seeds
  - Yield, pasta quality, cadmium levels
- **Microbiology**- John Peters, Carl Yeoman
  - Soil microbiology, microbe inoculants
  - Feed supplements to address nitrate poisoning associated with broadleaves in cover crop mixes
- **On Farm Precision Experimentation** -Bruce Maxwell
  - Soil Moisture/Climate Predictions- Kelsey Jensco-U of M Climate Center
  - Computer programing for data organization, analysis, prescription development
- **Optical Sensor-Based Spray Nozzles** -Joe Shaw, Prashant Jha
- **Herbicide Research for Weed Control and Herbicide Residue Management** -Prashant Jha
- **Farmer/Industry/Researcher Participatory Research Network** -Colter Ellis, George Haynes, Mary Burrows
  - Address barriers to adoption of products of this research project

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Outcomes

- **Farm incomes will increase $15-25 million in 18 months**
  - From pulse crops
  - Cover crop forage for livestock
  - Application of Precision Agriculture
- **Farm incomes will increase $100s of millions in 5-10 years**
  - Optimized land use
  - Improved pulse crop varieties and cover crop mixes adapted to MT
  - Improved durum wheat varieties adapted to MT
- **New Montana Jobs-**
  - Production of sensors, software, etc. for precision agriculture
  - Processing facilities for pea protein
  - Crop consultants/Data management consultants
  - On-farm jobs
- **Increased tax revenues**-better schools, infrastructure, communities

Sustainability, farm income, land values and MT tax receipts will increase.

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Questions

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